

References to Articles Descriptive of Railway Shops

- Armour Car Lines, Union Stock Yards. Car shops at Chicago, Ill. R. R. Gaz., Jan. 23, 1903. Ry. Age, Jan. 23, 1903.
- Armour Car Lines. Air Brake Testing Department of Car Repair Shops at Chicago. Ry. M. M., Dec., 1902.
- Atchison, Topeka & Santa Fe Railway. Locomotive Shops at Cleburne, Tex. Loc. Eng., April, 1900.
- Atchison, Topeka & Santa Fe Railway. Locomotive and Car Shops at Fort Madison, Iowa. R. R. Gaz., May 4, 1900.
- Atchison, Topeka & Santa Fe Railway. Locomotive and Car Shops at Topeka, Kan. Ry. M. M., serial, April to Oct., 1903. R. R. Gaz., Nov. 7, 1902. Ry. Age, July 2, 1907. Am. Eng., June, 1901; Sept., Oct., 1903. Eng. News, April 2, 1903.
- Atlantic Coast Line Railway. Locomotive Terminal at Waycross, Ga. Ry. M. M., April, 1906.
- Atlantic Coast Line Railway. Locomotive and Car Shops at Waycross, Ga. R. R. Gaz., June 9, 1905.
- Baltimore and Ohio Railroad. Locomotive Terminal at Holloway, O. Ry. M. M., June, 1903.
- Baltimore & Ohio Railroad. Locomotive Terminal at Keyser, W. Va. Ry. M. M., Nov., 1902.
- Baltimore & Ohio Railroad. Locomotive Terminals. Ry. Rev., Dec. 29, 1906.
- Buffalo, Rochester & Pittsburg Railroad. Locomotive Repair Shops at Dubois, Pa. Am. Eng., April, May, 1902. Ry. Rev., Feb. 14, 1903. Ry. Age, Feb. 13, 1903. Eng. Rec., Sept. 6, 1902. R. R. Gaz., Feb. 13, 1903.
- Canadian Pacific Railway. Locomotive and Car Shops at Angus, (Montreal) Can. Ry. M. M., April, May, August, 1905; Sept., Oct., Nov., 1906. Ry. Age, May 5, 1905; Oct. 17, 1902; Dec. 9, Dec. 16, 1904; Ry. Rev., Feb. 4, 1905. R. R. Gaz., Oct. 17, 1902. Am. Eng., Dec., 1904.
- Central Railroad of New Jersey. Locomotive and Car Shops at Elizabethport, N. J. R. R. Gaz., Dec. 27, 1901; Jan. 3, 1902. Ry. Age, Oct. 18, 1901. Am. Eng., Nov., 1901; Feb., 1902. Eng. Rec., Feb. 22, 1902; June 21, 1902.
- Chicago & Alton Railway. Locomotive and Car Shops at Bloomington, Ill. R. R. Gaz., June 27, 1902. Am. Eng., April, 1901.
- Chicago, Burlington & Quincy Railway (Hannibal and St. Joseph). Locomotive and Car Shops at Hannibal, Mo. Proceedings St. Louis Railway Club, May 16, 1902. R. R. Gaz., Oct. 5, 1900; Sept. 13, 1901. Ry. Age, Nov. 23, 1900; June 20, 1902.
- Chicago & Eastern Illinois Railway. Locomotive and Car Shops at Danville, Ill. Ry. M. M., June, Aug. 1904. Ry. Rev., Sept. 27, 1902; Aug. 22, 1903; July 9, 1904. Ry. Age, Nov. 20, 1903.
- Chicago Great Western Railway. Locomotive and Car Shops at Oelwein, Iowa. Ry. M. M., March, 1900. R. R. Gaz., June 21, 28, 1901. Ry. Rev., April 16, 1898; March 3, 10, 1900; June 25, 1904. Ry. Age, March 2, 1900.
- Chicago, Milwaukee & St. Paul Railway. Locomotive and Car Shops at Milwaukee, Wis. Ry. M. M., Feb., March, 1904. Am. Eng., Feb., 1899. R. R. Gaz., June 26, 1903. Ry. Age, Nov. 14, 1902. Eng. Rec., Nov. 14, 1903.
- Chicago & Northwestern Railway. Locomotive Terminal at Clinton, Iowa. Ry. M. M., Sept., 1900; March, 1901.
- Chicago & Northwestern Railway. Locomotive and Car Shops at Kinzie Street, Chicago, Ill. Ry. Age, May 30, 1902. Loc. Eng., Jan., 1902. Am. Eng., March, April, May, 1900. R. R. Gaz., Nov. 21, 1902.
- Chicago, Rock Island & Pacific Railway. Locomotive Shops at Silvis, Ill. Ry. M. M., Nov., Dec., 1904. Ry. Age, Aug. 21, 1903; Feb. 26, 1904; Aug. 19, 1905. Ry. Rev., Feb. 6, 1904. Eng. News, Feb. 11, 1904. R. R. Gaz., Feb. 5, 1904.
- Chicago, St. Paul, Minneapolis & Omaha Railway, St. Paul, Minn. Ry. Age, Aug. 22, 1902.
- Chicago, St. Paul, Minneapolis & Omaha Railway. Locomotive Shops at Sioux City, Iowa. R. R. Gaz., Sept. 11, 1903.
- Cleveland, Cincinnati, Chicago & St. Louis Railway. Locomotive and Car Shops at Beech Grove, (Indianapolis) Ind. Ry. Age, Aug. 3, 1906.
- Cincinnati, Hamilton & Dayton Railway. Locomotive and Car Shops at Ivorydale, O. Ry. Rev., Oct. 21, 1905; March 3, 1906. R. R. Gaz., Sept. 21, 1906. Eng. News, Oct. 11, 1906.
- Colorado & Southern Railway. Locomotive and Car Shops at Denver, Colo. R. R. Gaz., June 15, 1900. Am. Eng., Jan., 1901. Ry. Age, Nov. 14, 1900. Ry. Rev., Dec. 15, 1900.
- Delaware, Lackawanna & Western Railroad. Locomotive and Car Shops at Kingsland, N. J. Ry. M. M., April, 1906. Ry. Rev., June 9, 1906. Eng. Rec., Dec. 2, 1905. Ry. Age, Oct. 21, 1904.
- Delaware, Lackawanna & Western Railroad. Locomotive Shops at Scranton, Pa. Ry. Age, Oct. 28, 1904; April 12, 1907.
- Delaware, Lackawanna & Western Railroad. Car Shops at Scranton, Pa. Ry. M. M., Nov., 1906; Feb., March, 1907. R. R. Gaz., Jan. 9, 30, 1903. Ry. Rev., Jan. 17, Aug. 29, 1903. Ry. Age, Nov. 28, 1904.
- Delaware, Lackawanna & Western Railway. Locomotive Shops at East Buffalo, N. Y. Ry. Age, Dec. 30, 1904.
- Delaware & Hudson Railroad. Locomotive Terminal at Oneonta, N. Y. Ry. Eng., March, May, 1907.
- Denver & Rio Grande Railroad. Locomotive Terminals at Pueblo and Denver, Col. Ry. M. M., Dec., 1906; Jan., 1907. Ry. Eng., Dec., 1906; Jan., 1907.
- El Paso and Southwestern Railroad. Locomotive and Car Shops at El Paso, Tex. Ry. Eng., Feb., 1907. Ry. Rev., Dec. 29, 1906.
- Erie Railroad. Locomotive and Car Shops at Dunmore, Pa. Loc. Eng., Feb., 1902.
- Erie Railroad, Hornellsville, N. Y. Ry. Rev., Dec. 1, 1906. Am. Eng., Jan., 1907.
- Erie Railroad. Terminal Facilities. R. R. Gaz., June 15, 1906.
- Fort Worth & Denver City Railroad. Locomotive and Car Shops at Childress, Tex. R. R. Gaz., March 21, 1902.
- Grand Trunk Railway. Roundhouse at Mimico, Ont. Ry. Age, Sept., 22, 1905.
- Grand Trunk Railway. Locomotive Shops at Battle Creek, Mich. Ry. M. M., April, 1907. Ry. Age, March 8, 1907. Ry. Rev., March 9, 1907.
- Great Northern Railway. Locomotive Shops at Dale Street, St. Paul, Minn. R. R. Gaz., June 19, 1903. Am. Eng., June, 1903. Ry. Rev., June 20, 1903.
- Gulf & Ship Island Railroad. Locomotive and Car Shops at Gulfport, Miss. Ry. Rev., May 9, 1903.
- Hannibal & St. Joseph Railroad, Hannibal, Mo.. See Chicago, Burlington & Quincy.
- Illinois Central Railroad. Locomotive and Car Shops at Memphis, Tenn. R. R. Gaz., Oct. 17, 1902.
- Lake Shore & Michigan Southern Railway. Locomotive Terminal at Elkhart, Ind. Ry. M. M., Feb., March, 1905. Ry. Rev., April 1. Dec. 29, 1905. Am. Eng., Feb., March, 1905.
- Lake Shore & Michigan Southern Railway. Locomotive and Car Shops at Collinwood O. Ry. Age, April 11, 1902. Eng. News, Dec. 18, 1902. R. R. Gaz., Dec. 19, 1902. Am. Eng., serial, Oct. to Dec., 1902; Jan. to June, Sept. to Dec., 1903.
- Lehigh Valley Railroad. Locomotive and Car Shops at Sayre, Pa. Ry. Age, Sept. 30, 1904; Jan. 20, 1905; Dec. 22, 1905; May 29, June 19, 1903. Am. Eng., June, July, 1903. Eng. Rec., May 30, 1903. Eng. News, June 25, 1903; Jan. 26, 1905. R. R. Gaz., May 29, 1903; Jan. 27, 1905. Ry. Rev., April 28, 1900; June 20, 1903; Jan. 21, 1905.
- Louisville & Nashville Railroad. Locomotive and Car Shops at South Louisville, Ky. Ry. M. M., Nov., Dec., 1905; Jan., 1906. R. R. Gaz., June 9, 1905; March 9, 1906. Eng. News, Feb. 8, 1906. Ry. Rev., Oct. 7, Nov. 4, 1905.

Mexican Central Railway. Locomotive and Car Shops at Aguas Calientes, Mex. R. R. Gaz., April 8, 1900; Aug. 5, 12, 19, 1904. Am. Eng., Dec., 1903; May, Sept., 1904. Ry. Age June 6, 1900; Aug. 12, 19, 1904.

Michigan Central Railway. Locomotive Shops at Jackson, Mich. R. R. Gaz., April 23, 1897; Sept. 19, 1902. Ry. Age, June 20, 1902. Am. Eng., March, 1903.

Minneapolis & St. Louis Railroad. Locomotive and Car Shops at Cedar Lake, Minneapolis, Minn. Ry. Age, June 6, 1902. Ry. Rev., June 21, 1902.

Missouri, Kansas & Texas Railway. Gas Burning Heater with Fan System for Roundhouse at Parsons, Kans. Ry. M. M., Sept., 1906. Ry. Age, June 19, 1906.

Missouri, Kansas & Texas Railway. Locomotive Shops at Parsons, Kans. Ry. Age, April 13, 1906.

Missouri, Kansas & Texas Railway. Sedalia, Mo. Ry. Rev., Jan. 6, 1906.

Missouri Pacific Railway. Locomotive and Car Shops at Sedalia, Mo. Ry. M. M., March, 1906. Ry. Rev., Jan. 6, 1906. R. R. Gaz., Sept. 9, Oct. 14, 1904. Ry. Age, Sept. 23, 1904.

New York Central & Hudson River Railroad. Locomotive Shops at Depew N. Y. R. R. Gaz., Feb. 16, 1900. Eng. News, Dec. 21, 1893. Ry. Age, March 17, 1893. Loc. Eng., March, 1892. Ry. Rev., June 13, 1896; May 31, 1902.

New York Central & Hudson River Railroad. Repair Shops for Steel Freight Car Trucks at East Buffalo, N. Y. Am. Eng., May, 1902.

New York Central & Hudson River Railroad. Locomotive and Car Shops at Oak Grove, (Williamsport) Pa. Ry. M. M., June, 1902. Ry. Rev., May 31, 1902. R. R. Gaz., March 14, 1902.

New York Central & Hudson River Railroad. Erecting Shop of the Locomotive and Car Shops at West Albany, N. Y. Ry. M. M., Nov., 1902.

New York, New Haven & Hartford Railroad. Car Shops at Readville, Mass. Ry. M. M., April, 1904. Am. Eng., Feb., March, 1901. R. R. Gaz., Feb. 15, 1901. Ry. Age, July 26, 1901; March 28, 1902. Ry. Rev., June 18, 1904.

New York, Ontario & Western Railway. Paint Shop Heating at Middletown, N. Y. Ry. M. M., June, 1907.

New York, Ontario & Western Railway. Roundhouse at Middletown, N. Y. Ry. Age, June 30, 1905.

Norfolk & Western Railway. Locomotive and Car Shops at Roanoke, Va. R. R. Gaz., June 20, 1902. Ry. Rev., July 12, 1902. Ry. Age, June 24, 1902.

Northern Pacific Railway. Blacksmith Shop Ventilating System at Brainard, Minn. Ry. M. M., March, 1904.

Oregon Short Line Railroad. Locomotive and Car Shops at Pocatello, Idaho. Ry. M. M., June, 1902. R. R. Gaz., June 27, 1902. Ry. Age, March 28, 1902. Ry. Rev., Feb. 7, 1903. Eng. News, Oct. 15, 1903.

Pennsylvania Railroad. Locomotive Shops at Trenton, N. J. Ry. M. M., May, June, 1907. Ry. Age, Aug. 10, 1906; Sept. 9, 1904.

Pennsylvania Railroad. Locomotive Terminal at East Altoona, Pa. Ry. Age, Jan. 19, 1906. R. R. Gaz., March 16, 1906. Am. Eng., Feb., March, 1906.

Pennsylvania Railroad. Locomotive and Car Shops at Renova, Pa. Ry. Age, Aug. 14, 1903.

Pennsylvania Lines, Northwest System. Locomotive Shops at Fort Wayne, Ind. R. R. Gaz., May 1, 1903.

Pennsylvania Lines, Southwest System. (P., C., C. & St. L.) Locomotive and Car Shops at Columbus, O. Ry. Rev., Jan. 11, 1902. R. R. Gaz., April 17, 1903.

Pennsylvania Railroad. Foundries at South Altoona, Pa. R. R. Gaz., March 17, 1905. Ry. Rev., June 10, 1905. Am. Eng., April, Sept., 1906.

Pennsylvania Railroad. Locomotive Shops at Olean, N. Y. Ry. Age, Nov. 17, 1905.

Pere Marquette Railroad. Locomotive Shops at Grand Rapids,

Mich. Ry. M. M., Feb., 1905, March, 1905. Ry. Age, March 24, 1905. Ry. Rev., Oct. 29, Nov. 5, 1904.

Philadelphia, Baltimore & Wilmington Railway. Locomotive and Car Shops at Wilmington, Del. R. R. Gaz., March 11, 1904. Ry. Age, April 8, 1904. Ry. Rev., June 16, 1906.

Philadelphia & Reading Railroad. Locomotive Shops at Reading, Pa. R. R. Gaz., Dec. 12, 1902. Eng. News, May 24, 1900. Ry. Age, Nov. 10, 1899; May 23, 1902; March 6, 1903. Ry. Rev., May 19, 1900. Am. Eng., serial, Jan. to June, Oct., Nov., 1903.

Pittsburg & Lake Erie Railroad. Locomotive and Car Shops at McKees Rocks, Pittsburg, Pa. R. R. Gaz., June 27, 1902. Eng. News, Aug. 14, 1902. Ry. Age, Feb. 28, April 18, 1903; Dec. 18, 1903. Ry. Rev., Dec. 5, 12, 26, 1903. Am. Eng., serial, Nov., 1903, to Feb., 1904, and Aug. to Oct., 1904.

St. Louis, Iron Mountain & Southern Railway. Locomotive and Car Shops at Baring Cross, Ark. Ry. Age, March 2, 1900; June 13, 1902. Ry. Rev., June 14, 21, 1902.

Seaboard Air Line Railway. Locomotive and Car Shops at Portsmouth. Ry. M. M., March, 1904. Ry. Age, Jan. 15, 1904.

Southern Railway. Locomotive Shop at Spencer, N. C. R. R. Gaz., Nov. 25, 1904.

Southern Railway. Locomotive and Car Shops at Sheffield, Ala. Ry. Age, May 16, 1902.

Southern Railway. Locomotive Terminal. Ry. Rev., May 18, 1907.

Southern California Railroad (A., T. & S. F.). Locomotive and Car Shops at San Bernardino, Cal. Ry. Age, Sept. 26, 1902. R. R. Gaz., Aug. 29, 1902.

Southern Pacific Railway. Locomotive and Car Shops at East Los Angeles, Cal. R. R. Gaz., Aug. 14, 1903.

Terminal Railroad Association of St. Louis. Locomotive Terminal at St. Louis, Mo. Ry. M. M., Oct., 1904. Ry. Age, July 29, 1904. Ry. Rev., Oct. 15, 1904.

Terminal Railroad Association of St. Louis. Locomotive and Car Shops at East St. Louis, Ill. Ry. M. M., April, May, 1904. Ry. Rev., Feb. 20, 1904, April 16, 1904.

Union Pacific Railway. Locomotive and Car Shops at Omaha, Neb. Ry. Age, Dec. 12, 1902.

Wabash Railroad. Car Shops at East Decatur, Ill. Ry. Age, Jan. 4, 1907.

Wabash Railroad. Locomotive Terminal at Landers, Ill. Ry. M. M., May, 1906.

Wisconsin Central Railway. Locomotive and Car Shops at Fond du Lac, Wis. Ry. M. M., April, 1901. Ry. Rev., Jan. 19, 1901. Ry. Age, June 21, 28, 1901. Am. Eng., May, 1901.

REFERENCES TO GENERAL ARTICLES CONCERNING RAILWAY SHOPS.

Railway Shops, by R. H. Soule. Serial, Am. Eng., 1903-1904. Introductory, Feb., 1903. General Considerations, March, 1903. The erecting shop, April, 1903. The machine shop, May, 1903. The boiler shop and the smith shop, June, 1903. The passenger car repair shop, Oct., 1903. The freight car repair shop and yard, Nov., 1903. The planing mill, Dec., 1903. The power plant, Jan., 1904. The storehouse, Feb., 1904. The foundry, March, 1904. The roundhouse, April, 1904. The layout, May, 1904. Conclusions, June, 1904.

Railroad shops, by Walter G. Berg. Serial, R. R. Gaz., March 13-20, April 3-10, 1903.

A Typical Shop to Serve a Road or Division Equipped with 300 Locomotives, by L. R. Pomeroy. Proceedings, American Railway Master Mechanics' Association, 1902. Eng. News, July 3, 1902. Ry. Rev., July 12, 1902. R. R. Gaz., Oct. 24, 1902. Am. Eng., Aug., 1902.

Railroad Repair Shop Design and Equipment, by George A. Damon. Proceedings, Western Railway Club, April, 1903. Eng. News, May 14, 1903. Ry. Age, April 24, 1903.

Ideal Blacksmith Shop and Equipment for General Railroad Work. Proceedings, International Railroad Master Blacksmiths' Association, 1904.

- Location of Tanks in Oil Houses. By L. T. Johnson. Central Railway Club, March, 1904.
- Compressed Air Pneumatic Tools in Railroad Service. By Thos. Aldcorn. Central Railway Club, May, 1904.
- Economic Management of Railroad Car Shops. Pacific Coast Railway Club, February, 1904.
- Modern Roundhouse Construction. By M. E. Merrill. New England Railroad Club, November, 1904.
- Repairs to Steel Freight Cars. By C. A. Seley (plan for proposed shop). Am. Eng., June, 1900.
- Some Notes on Steel Car Repairing, (describing several railroad shops for repairing steel cars). R. R. Gaz., June 5, 1903.
- Shop Practice and Maintenance of All Steel Cars. Central Railway Club, January, 1902.
- Motor Driven Machinery. By O. H. Bigelow. New England Railroad Club, December, 1902.
- Electrically Driven Shop. By R. L. Warner. New England Railroad Club, December, 1902.
- Best Shop Practice and Shop Changes for Repairing Steel Cars, Committee Report. Proceedings, Central Railway Club, Jan., 1902. R. R. Gaz., Jan. 24, 1902.
- Machine Rating. By J. F. DeVoy. Western Railway Club, December, 1903.
- Machine Tools and High Speed Steel. By J. A. Carney. Western Railway Club, December, 1903.
- The Railroad Paint Shop. By W. O. Quest, Proceedings, Railway Club of Pittsburg, Nov., 1903. R. R. Gaz., Dec. 11, 1903.
- The Arrangement of Boiler Shops. By F. M. Whyte. Am. Eng., June, 1900.
- Power Transmission by Shafting vs. Electricity, committee report. Proceedings, American Railway Master Mechanics' Association, 1900.
- The Advantages of Electrically Driven Railroad Shops. By L. R. Pomeroy. Proceedings, Central Railway Club, Nov., 1902, and January, 1903. Ry. Rev., Nov. 22, Dec. 27, 1902. Ry. Age, Nov. 21, 1902. Am. Eng., Feb. 1903. R. R. Gaz., Dec. 19, 1902.
- Modern Tendencies in the Development and Transmission of Power. By John J. Flather. Proceedings, American Association Advancement of Science, Dec., 1902. Eng. News, Jan. 1, 1903.
- Electric Driving for Shops. By C. A. Seley. Proceedings, American Railway Master Mechanics' Association, 1902. Ry. M. M., July, 1902. Ry. Rev., July 12, 1902. R. R. Gaz., June 27, July 4, 1902. Ry. Age, Feb. 27, 1903. (Discussion, New York Railroad Club). Eng. News, July 3, 1902. Am. Eng., July, 1902. R. R. Gaz., May 12, 1905.
- Electrically Driven Shops, committee report. Proceedings, American Railway Master Mechanics' Association, 1903. Ry. M. M., July, 1903. R. R. Gaz., June 26, 1903. Ry. Rev., Dec. 19, 1903. Eng. News, July 2, 1903. Am. Eng., July, 1903. Ry. Age, June 26, 1903.
- Electricity in Railroad Shops. R. R. Gaz., May 29, 1903.
- Machine Tools. By James K. Cullen. Proceedings, Western Railway Club, Nov., 1902. Ry. Age, Nov. 21, 1902.
- The Power Question in Locomotive Repair Shops. By R. W. Stovel. Proceedings, Railway Club of Pittsburg. Ry. Age, April 4, 1902. Ry. Rev., June 14, 1902.
- The Value of Up to Date Tools in Railroad Shops. By M. K. Barnum. Proceedings, Western Railway Club, March, 1902. Ry. M. M., April, 1902. R. R. Gaz., March 21, 1902.
- Electric Equipment in Modern Machine Shop Practice. By F. B. Duncan. Proceedings, Engineers Society of Western Pennsylvania, May, 1902.
- Heating and Ventilating of Railroad Shops. By J. I. Lyle. Proceedings, New York Railroad Club, March, 1903. Ry. Age, April 3, 1903. R. R. Gaz., March 27, 1903.
- Heating and Ventilating Car and Locomotive Paint Shops. By W. H. Dutton. Proceedings, Master Car and Locomotive Painters' Association, Sept., 1903. Ry. Age, Sept. 11, 1903.
- The Economical Heating of Railway Repair Shops. By W. H. Carrier. Ry. Age, June 30, 1903.
- Lengthening Roundhouse Stalls. Ry. M. M., May, 1901.
- Up to Date Roundhouses. Proceedings, American Railway Master Mechanics' Association, 1901. Ry. M. M., July, 1901.
- Cranes for Railway Shops. By G. R. Brandon. Ry. M. M., March, 1903.
- Electric Wiring of Machine Tools. Ry. M. M., April, 1904.
- Variable Speed Motors. By C. A. Seley. Proceedings, American Railway Master Mechanics' Association, 1904. Ry. M. M., July, 1904. Am. Eng., Aug., 1904. R. R. Gaz., July 1, 1904.
- Terminals for Locomotives. Proceedings, American Railway Master Mechanics' Association, 1904. Ry. M. M., July, 1904.
- A Marked Advance in Locomotive Boiler Maintenance. By A. R. Raymer. Proceedings, Western Railway Club, Oct., 1904. Ry. M. M., Nov., 1904. Ry. Age, Oct. 21, 1904. R. R. Gaz., Oct. 21, 1904. Am. Eng., Nov., 1904.
- Equipment for a Modern Blacksmith Shop for Railway Work. By A. W. McCaslin. Proceedings, National Railroad Master Blacksmiths' Association, 1904. Ry. M. M., Nov., 1904.
- Systems of Electrical Distribution in Railway Shops. By J. Henry Klinck. Ry. M. M., April, 1905.
- The Organization of Railway Shop Forces. By H. T. Bentley. Western Railway Club, September, 1905.
- Ideal Blacksmith Shop. Proceedings, International Railroad Master Blacksmiths' Association, 1905.
- Saw Tooth Skylights in Factory Roof Construction. By F. S. Hynes. Proceedings, American Society of Mechanical Engineers, 1906.
- Saw Tooth Roofs for Factories. By K. C. Richmond. Proceedings, American Society of Mechanical Engineers, 1906.
- The Art of Cutting Metals. By Fred W. Taylor. Proceedings, American Society of Mechanical Engineers, 1906.
- Electric Light Wiring for Roundhouses. Ry. M. M., Aug., 1906.
- Railroad Repair Shops. By G. R. Henderson. New England Railroad Club, April, 1907.
- Transfer Tables for Locomotive Shops. Ry. M. M., Jan., Feb., 1907.
- Freight Car Repair Facilities. Ry. M. M., Dec., 1906; Jan., Feb., 1907.
- Reinforced Concrete Roundhouses. Ry. Rev., March 17, 1906.
- American Roundhouses and Their Operations. By W. E. Dunham. R. R. Gaz., May 19, 1905.
- Recommendations Relative to the Requirements of a Modern Roundhouse. Proceedings, American Railway Engineering and Maintenance of Way Association, 1905. Ry. Age, March 24, 1905.
- Locomotive Terminal Facilities. Proceedings, American Railway Master Mechanics' Association, 1905. Ry. M. M., July, 1905. Ry. Age, June 16, 1905. Am. Eng., Aug., 1905. R. R. Gaz., June 16, 1905.
- Shop Layouts. Proceedings, American Railway Master Mechanics' Association, 1905. Ry. M. M., July, 1905. Ry. Age, June 17, 1905. Ry. Rev., June 17, 1905.
- Buildings. Proceedings, American Railway Engineering and Maintenance of Way Association, 1906. Ry. Age, March 23, 1906.
- Organization and Economy in the Railway Machine Shop. By H. W. Jacobs. Eng. Mag., serial beginning Sept., 1906.
- Some Small Successful Shop Savings. By C. J. Crowley. Proceedings, Western Railway Club, Feb., 1906.
- The Development of Railroad Shop Practice in the United States. By M. K. Barnum. R. R. Gaz., May 5, 1905.
- Roundhouse Framing. By R. D. Coombs. Proceedings, American Society of Civil Engineers. R. R. Gaz., June 9, 1905.

Improved Roundhouse Facilities. By J. C. Stuart. *R. R. Gaz.*, June 15, 1906.

Square Roundhouse. By G. P. Nichols. *Proceedings, Western Railway Club*, Feb., 1904. *Ry. Age*, Feb. 19, 1904.

Shop Management, Organization and Methods. By H. A. Lyddon. *Proceedings, North West Railway Club*, March, 1904. *Ry. Rev.*, May 14, 1904.

Shop Management. By F. A. Parkhurst. *Proceedings, New England Railroad Club*, Dec., 1904. *Ry. Rev.*, Feb. 25, 1905.

Modern Shop Design. By A. Prengle. *Proceedings, Canadian Society of Civil Engineers*, Nov., 1903. *Ry. Rev.*, Jan., 1904.

A Plan for Maintaining Railroad Machinery. By M. K. Barnum. *Proceedings, Western Railway Club*, May, 1905. *Am. Eng.*, April, 1905.

Track Arrangements in Locomotive Shops. By C. A. Seley. *Am. Eng.*, June, 1904.

Method of Heating and Ventilating Roundhouses. *Proceedings, American Railway Master Mechanics' Association*, 1905.

Locomotive Terminal Facilities and Methods of Handling Car Scrap and Usable Material. *Proceedings, Master Car Builders' Association*, 1906.

Name of Periodical.	Abbreviation.
American Engineer and Railroad Journal.....	Am. Eng.
Engineering News	Eng. News
Engineering Record	Eng. Rec.
Locomotive Engineering	Loc. Eng.
Railroad Gazette	R. R. Gaz.
Railway Age	Ry. Age.
Railway Engineering and Maintenance of Way.....	Ry. Eng.
Railway Master Mechanic	Ry. M. M.
Railway and Engineering Review	Ry. Rev.

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National Machinery Co., Tiffin, O.

Sellers & Co., William, Philadelphia, Pa.

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Armstrong Bros. Tool Co., Chicago.

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Acme Machinery Co., Cleveland, O.

Ajax Mfg. Co., Cleveland, O.
National Machinery Co., Tiffin, O.

Bolt Pointing Machines.
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will do more work and cause less trouble than any other tools you can put on your lathes and planers. Experience counts in making tool holders just as it does in any other line, yours for instance. It's easy for us to make better tool holders than anybody else; that's been our specialty for years, and it don't cost us (or you) one cent extra.

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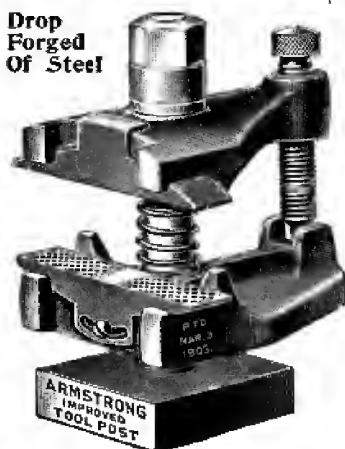
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in your erecting and repair department will repay their cost many times in the course of a year. They have a special field of their own in which neither air or electric drills nor the common ratchet can compete.



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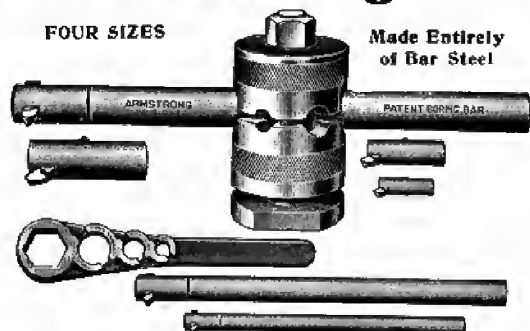
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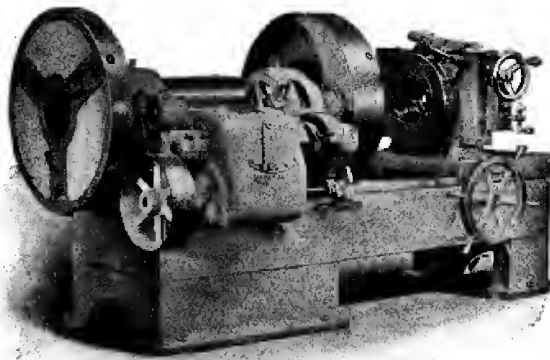
Armstrong Bros. Tool Co.

129 N. Francisco Ave., Chicago, U. S. A.

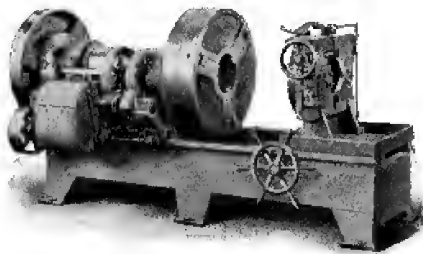
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This cut shows the No. 6 machine which threads and cuts off from $1\frac{1}{4}$ in. to 6 in. It has ten speeds, two gripping chucks, sliding head, steel clad die head and other improvements.



We have a complete line of machines for threading all sizes of pipe from $\frac{1}{4}$ to 12 inches. Each machine was designed with the idea of getting the work out rapidly, with as little wear as possible. Hence we use hardened steel instead of cast iron in many places. To get the work out we give a large number of speeds.

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Williams Tool Co., Erie, Pa.
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- Boring Mills.**
Bullard Machine Tool Co., Bridgeport, Conn.
Prentiss Tool & Supply Co., New York.
Sellers & Co., Wm., Philadelphia, Pa.
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Foote-Burt Co., Cleveland, O.
- Boring Machines, Wood.**
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- Brake Jaws.**
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- Brake Shoes.**
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Homestead Valve Mfg. Co., Pittsburg, Pa.
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- Brass Working Machinery.**
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Cleanola Co., Allegheny, Pa.
- Car Cleaning Brushes.**
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National Malleable Castings Co., Cleveland, O.
- Car Forgings.**
Cleveland City Forge & Iron Co., Cleveland, O.
- Car Gaining Machines.**
(See Woodworking Machinery.)
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- Car Paints.**
See Paints.
- Car Roofing.**
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Safety Car Heating & Lighting Co., New York.

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Vulcan Iron Works, Wilkes Barre, Pa.

Car Wheel and Crank Pin Presses.
Watson-Stillman Co., New York.

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Ralston Steel Car Co., Columbus, O.

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Ralston Steel Car Co., Columbus, O.

Cars, Steel.
Bettendorf Axle Co., Davenport, Ia.

Cars, Tank.
Bettendorf Axle Co., Davenport, Ia.

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Metal Plated Car & Lumber Co., New York.

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Honestead Valve Mfg. Co., Pittsburgh, Pa.

Castings, Railway.
Chester Steel Castings Co., Phila., Pa.
Gould Coupler Co., New York.
National Malleable Castings Co., Cleveland, O.
Vulcan Iron Works, Wilkes Barre, Pa.

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National Malleable Castings Co., Cleveland, O.

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Standard Tool Co., Cleveland, O.

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American Wood Working Machinery Co., New York.
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Lucas & Co., John, Philadelphia, Pa.

Cold Water Paints.
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Standard Tool Co., Cleveland, O.

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Gould Coupler Co., New York.

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Vulcan Iron Works, Wilkes Barre, Pa.

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Smith, J. D., Foundry Supply Co., Cleveland, O.

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Gould Coupler Co., New York.
McConway & Torley Co., Pittsburgh.
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Gould Coupler Co., New York.

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Whiting Foundry Equipment Co., Harvey, Ill.

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Watson-Stillman Co., New York.

Crank Pin Turners.
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McInnes Steel Co., Corry, Pa.

Crushed Steel.
Pittsburg Crushed Steel Co., Pittsburg, Pa.

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Smith, J. D., Foundry Supply Co., Cleveland, O.

Curled Hair.
Baeder, Adamson & Co., Philadelphia, Pa.

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Bentel & Margedant Co., Hamilton, O.
Smith, H. B. Mach. Co., Smithville, N. J.

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Armstrong Bros. Tool Co., Chicago, Ill.

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Standard Tool Co., Cleveland, O.

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Armstrong Bros. Tool Co., Chicago.

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Franklin Mfg. Co., Franklin, Pa.

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American Wood Working Machinery Co., New York.

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Geometric Tool Co., New Haven, Conn.

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McInnes Steel Co., Corry, Pa.

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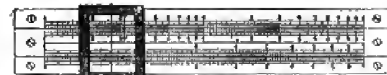
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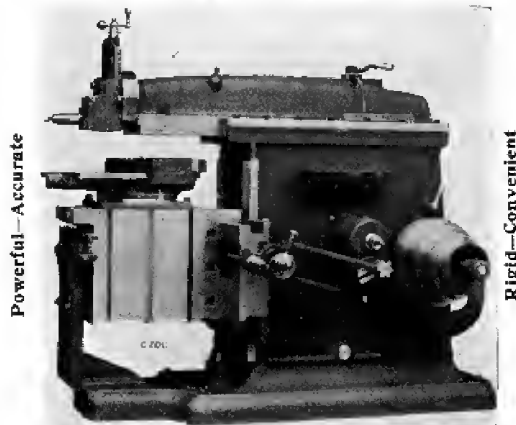
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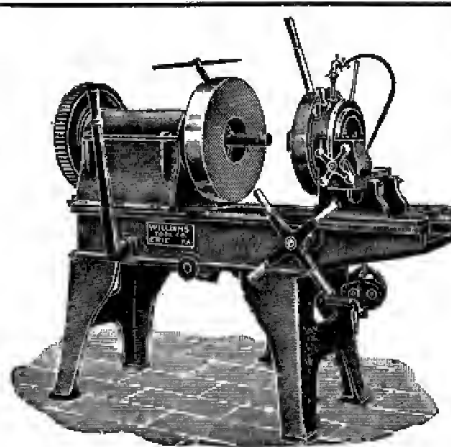


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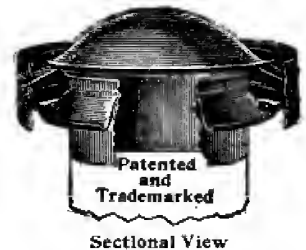
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Grinding Machines.
American Wood Working Machinery
Co., New York.
Becker-Brainerd Milling Machine Co.,
Hyde Park, Mass.
Bentel & Margedant Co., Hamilton, O.
Coates Clipper Mfg. Co., Worcester,
Mass.
Landis Tool Co., Waynesboro, Pa.
Sellers & Co., Wm., Philadelphia, Pa.
Smith, H. B. Mach. Co., Smithville, N. J.
Grinding Machine Attachments.
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Pittsburg Crushed Steel Co., Pittsburg,
Pa.
Springfield Mfg. Co., Bridgeport, Conn.
Grip Sockets.
Standard Tool Co., Cleveland, O.
Hack Saw Blades.
Diamond Saw & Stamping Works, Buf-
falo, N. Y.
Starrett, L. S. Co., Athol, Mass.
Hack Saws.
Diamond Saw & Stamping Works, Buf-
falo, N. Y.
Hack Saw Machines, Power.
Diamond Saw & Stamping Works, Buf-
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Jib Cranes.
Whiting Foundry Equipment Co., Harvey, Ill.
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Journal Box Packing.
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